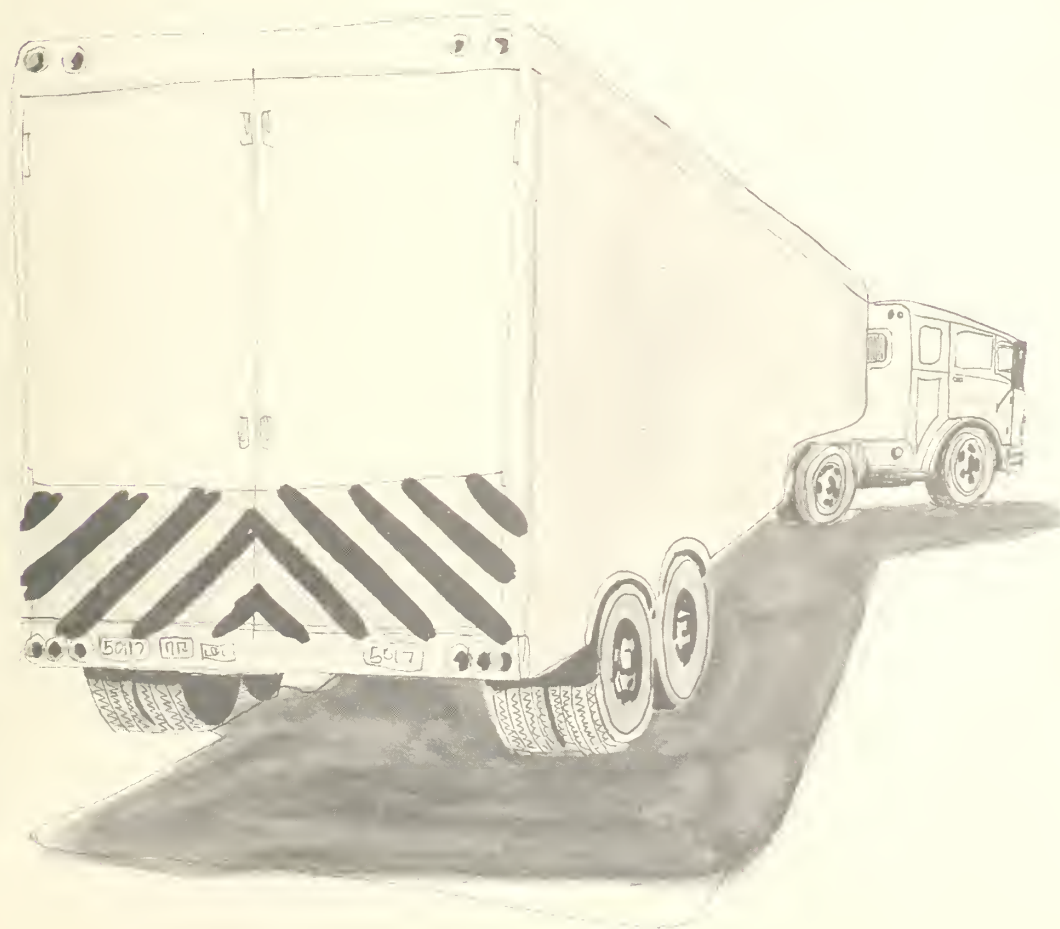


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ECONOMIC PERFORMANCE OF MOTOR CARRIERS OPERATING UNDER THE AGRICULTURAL EXEMPTION IN INTERSTATE TRUCKING

MARKETING RESEARCH REPORT NO.838
ECONOMIC RESEARCH SERVICE
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PREFACE

Research concerning the performance of the exempt sector of the motor carrier industry is especially difficult because firms engaged in the interstate trucking of exempt commodities are not required to file reports of rates, traffic, and earnings to any regulatory body or trade association. Further, the large number of firms engaged in this service, many of which are operated as individual or family proprietorships, with no fixed addresses or headquarters, has made it costly to conduct surveys. A considerable amount of

the evaluation of economic performance can be done only by inference.

Much of the analysis in this report was done in the fall of 1965 at the request of the Executive Task Force on Transportation. The author has drawn on the limited data that are available and cast these into a systematic argument so that the issues and problems are sharpened. Conclusions are stated in a positive manner and yet they must be considered provisional in light of the paucity of data.

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SUMMARY

The available evidence indicates that exempt motor carriers provide a price-product combination which users prefer to that of regulated carriers. Surveys of shippers have indicated that the quality of service provided by exempt carriers is superior, and that the rates of the exempt carriers are generally lower than regulated rates.

The exempt sector of the motor carrier industry as judged against the usual standards of economic efficiency seems to be performing satisfactorily. The output decisions in the sector appear to be made following a rough approximation to the marginal cost principle. The rate structure seems to be patterned closely on the costs of providing services. On any single round trip, the combined rates yield revenues approximately equal to the average cost of providing services, subject only to availability of backhauls. Furthermore, rates exhibit a close relationship with distance. The available evidence from the exempt sector, conclusions of other studies, foreign experience with nonregulated trucking, and conclusions of studies dealing with other modes of transportation are all inconsistent with the hypothesis of "excessive competition" in the exempt sector.

The agricultural exemption has had some effects on other modes of transportation and other sectors of the motor carrier industry. It probably caused some diversion of exempt

commodity traffic from rail to trucks prior to 1957. The net effect of the agricultural exemption on private carriage is not certain. It may have encouraged the growth of private carriage by providing backhauls of exempt commodities. On the other hand, because of their cost-based rates, the exempt carriers acted as substitutes for private carriers.

Under the agricultural exemption, the share of regulated motor carriers in the exempt commodity traffic has been negligible. Although only limited empirical data are available, the examination of possible explanations for the meager participation of regulated motor carriers in this traffic indicated that, other things being equal, exempt carriers have lower operating costs than regulated carriers.

The results from including the agricultural exemption in the Motor Carrier Act of 1935 appear to be consistent with the expectation of Congress that under exemption carriers would provide higher quality services and/or lower rates to shippers of agricultural commodities. The accumulated evidence examined in this study indicates that the exemption has achieved these objectives of Congress. The overall economic performance of the exempt sector appears to be efficient and therefore not inconsistent with the basic national transportation policy contained in the Interstate Commerce Act.

Economic Performance of Motor Carriers Operating Under The Agricultural Exemption in Interstate Trucking

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INTRODUCTION

The for-hire transportation of unmanufactured agricultural products, livestock, and fish by truck in interstate commerce is exempt from economic regulation by Section 203 (b), Subsection 6 of the Motor Carrier Act of 1935 as amended. This section is known as the "agricultural exemption."

According to the Census of Transportation, an estimated 11,369 such carriers, hereafter called exempt motor carriers (EMC), were operating in 1963. This was almost equal to the number of all Class III regulated carriers (i.e., carriers with annual gross operating revenues of less than \$200,000 each), but considerably smaller than earlier estimates (21, pp. 19-21).² In 1960, the Interstate Commerce Commission had estimated that 37,515 EMC were operating in the United States (12, p. 137).³

According to the estimates based on the Census of Transportation, a total of 30,500 to 38,300 motor vehicles were operated by EMC in 1963. Thus, of the estimated 679,000 trucks used in for-hire services in the United States that year, only some 4.5 to 5.6 percent

operated entirely under the agricultural exemption.

In addition to exempt carriers, other motor carriers also participate in transportation of agricultural commodities. According to court interpretations and a subsequent amendment to the agricultural exemption, any motor vehicle hauling an "exempt" commodity is free from economic regulation as long as "nonexempt" commodities are not moved in the same vehicle at the same time (27, p. 8).

The purpose of this report is to analyze performance of the sector of the motor carrier industry operating under the agricultural exemption. The performance of the sector is judged against two criteria: (1) The original purpose of the agricultural exemption, and (2) standards of economic efficiency.

Original Purpose of the Agricultural Exemption

In 1935, a bill was introduced in the Senate to regulate transportation by motor carriers. The bill, as introduced, made no direct reference to any exemption for farmers or farm products from economic regulation.

Several farm organizations opposed the bill for two main reasons: The bill, if enacted, would, they said, (1) impair the quality of transport services by limiting the flexibility of highway transportation necessary for distribution of agricultural products, and (2) unnecessarily increase the cost to farmers of highway transportation. Several other reasons cited are very similar to these two (27, p. 3).

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² Underscored numbers in parentheses refer to items in the Literature Cited, p. 20.

³ Three estimates of the number of motor vehicles are available (18 and 21). The estimate based on the truck inventory and use survey of the 1963 Census of Transportation is 30,483. The estimate based on the motor carrier survey of the 1963 Census of Transportation is 38,300. The estimate based on the 1960 U.S. Department of Agriculture survey data is 35,615. The differences between these estimates do not seem unreasonable and may be attributed in part to methods of estimation and to sampling variation.

In spite of this opposition, the Senate passed the bill.

The bill that passed the House included an agricultural exemption in the following form:

Section 203

(b) Nothing in this part, except the provisions of Section 204 relative to qualifications and maximum hours of service of employees and safety of operations or standards of equipment shall be construed to include ***

(4a) Motor vehicles controlled and operated by any farmer, and used in the transportation of his agricultural commodities and products thereof, or in the transportation of supplies to his farm; or

(4b) Motor vehicles controlled and operated by a cooperative association as defined in the Agricultural Marketing Act, approved June 15, 1929, as amended; or ***

(6) Motor vehicles used exclusively in carrying livestock, fish (including shellfish), or agricultural commodities (not including manufactured products thereof);

The bill as enacted included the exemption. It became law (P.L. 255) on August 9, 1935. It was designated the Motor Carrier Act of 1935 and was incorporated as Part II of the Interstate Commerce Act.

The main reason for including the agricultural exemption in the Act was to help farmers.⁴ Thus, the Congress by incorporating the exemption into the Act implicitly agreed with farm organizations that in the particular circumstances of agriculture unregulated

transportation by truck would assure higher quality services at lower prices in the overall marketing of farm products, thus contributing to farm income.

One standard for evaluating the performance of EMC, therefore, is clear: whether the agricultural exemption is achieving its intended objective of yielding high-quality services at low rates.

It is possible, however, that the sector of the motor carrier industry operating under the agricultural exemption may be economically inefficient. If this is the case, the agricultural exemption would be inconsistent with the basic objective of the national transport policy to assure the availability of transport services at the lowest economic cost to the Nation.

Furthermore, the agricultural exemption may have had some ill effects on other modes of transportation or on other sectors of the motor carrier industry. It is necessary to isolate the effects attributable to the agricultural exemption and investigate the nature of these effects.

Scope and Method of the Study

This study is limited to economic considerations of efficiency in use of resources. It does not take into account political, ethical, or other noneconomic factors which may outweigh economic considerations in policy decisions.

The plan of the report is as follows: The first part is a discussion of quality of service and rates in the exempt sector. The second part deals with the performance of the sector. It examines the decisionmaking, cost-rate, rate-distance relationships, and the evidence for "excessive competition." The third part discusses the effects of agricultural exemption on other motor carriers and other modes of transportation and whether these effects appear to have resulted in higher social costs or lower social benefits than would have been achieved without the exemption.

⁴ For further detail see debate on the bill, especially statements of Representative Holmes quoted in (27, pp. 4-7 and 39-71).

PRICE-PRODUCT DIMENSION

The seasonality, perishability, and relatively rapid and wide fluctuations in prices of many agricultural commodities make flexibility and speed in reaching markets necessary. With the route, gateway, commodity, and service restrictions in the certificates of motor common carriers, it cannot be expected that regulated carriers could provide such service. For example, a quick examination of a routing guide shows that shipments of agricultural commodities from many producing areas to major markets would involve one or more interchanges of equipment among regulated carriers, due to restricted operating authorities of individual regulated carriers.

The EMC, on the other hand, can move from any point of origin to any market and in any direction. Delays and handling costs connected with interchange of equipment are avoided.

Freedom of entry into any transport market is necessary not only to expedite delivery of perishable products but also to assure an adequate supply of carrying equipment in various shipping areas, especially to meet seasonal peak demands. The economic explanation of this is as follows: During the peak shipping season, the quantity of transport services demanded exceeds that supplied at the prevailing freight rates, causing an increase in rates. Higher freight rates attract an additional supply of carrying equipment into this market. Conversely, during an off-season, freight rates fall since there is an oversupply of transport services. This causes carriers to shift to other markets or out of the industry entirely.

There is some evidence from one market to show that this really happens. It is difficult to estimate actual variations in freight rates between seasons because some commodities move only during one season or are produced in different geographic areas in different seasons. Nevertheless, shippers and truckers estimate that rates on fresh fruit and vegetables from California are about 10 to 15 percent lower during the winter for similar commodities moving the same distances than they are at the summer peak of production.

Furthermore, 26 percent of the EMC truckers interviewed during July 1965 stated that they shifted to other markets during the off-peak months for California's produce (17, p. 229). These shifts, together with reduced numbers of trips per truck, reflect changes in the supply-demand relationship from one season to another.

Rate instability imposes some costs on shippers (8, pp. 265-269). These costs could be avoided to a considerable extent if shippers contracted with one or more carriers to provide transport services at agreed rates for a certain period of time. Although such agreements exist in the exempt sector, their infrequent use suggests that costs of rate fluctuations are not significant.

Rates in the exempt sector are determined by negotiations, either between trucker and shipper directly, or through a truck broker. A shipper may call several truckers or brokers and take the best rate offered. Conversely, a trucker may call on several shippers or brokers and take the best rate offered. In all cases, however, the object of negotiation is to set the rate for only one shipment. Most of these carriers are small, operating fewer than five trucks. In such circumstances, it is very difficult to visualize effective rate discrimination among shippers.

Some evidence tends to substantiate this. In a small sample of rates collected in California, no significant difference was found between rates paid by small and large shippers.⁵ Also, Lamkin found no significant differences in rates paid by country and terminal elevators in 11 Midwestern States for grain shipments in 1966 (14, p. 75-77).

The ability of carriers to shift among markets and the incentives provided by rate changes would also seem to minimize the seasonal underutilization of capacity. In the exempt sector, the extent of reserve capacity to meet peak demands presumably is determined by the willingness of the peak capacity users to maintain it through higher rates. Imposing the cost of maintaining the reserve capacity on its users is preferred on the

⁵ Unpublished data collected by the author.

grounds of efficiency in the use of resources over that of spreading the cost among all shippers.

Shippers say that in other respects as well, the EMC provide services that are superior to those of regulated carriers. The EMC are said to be small businessmen who are more willing to adapt their time schedules to those of the shippers and, in general, give more personalized service than larger firms. For example, produce shippers maintain that small, exempt truckers exercise more care in handling cargo and checking temperature and humidity in transit than drivers of regulated carriers. This is attributed to differences in incentives. For an EMC firm, its performance record is its principal means of obtaining future loads. For an EMC driver, the incentive is even greater since his remuneration is usually a percentage of the gross revenue earned on the trip.

Competition, however, not only provides incentives for satisfactory service but also penalizes failures severely. A trucker with a record of irresponsibility does not stay in business.

The EMC are reported by shippers as willing to haul from farms and load and unload at multiple points. This is a very important factor in the transportation of some commodities. It has been estimated that on the average trucks hauling produce from California in 1962-63 made 2.28 pickups and 1.56 deliveries (19, p. 11).

This discussion of quality characteristics, however, cannot be divorced from the question of prices. Obviously, shippers prefer a high quality of services at low rates, as the Congress assumed would accrue when it incorporated the agricultural exemption in the Act. Two studies (described below) provide some evidence that in addition to the superior services of EMC, exempt rates tend to be lower than regulated rates, other things being equal.

As a result of court decisions, fresh-dressed poultry came under the agricultural exemption in 1955, and frozen poultry in 1956. The U.S. Department of Agriculture studied conditions that existed in the poultry processing industry in calendar years 1952 and 1955, before the court decisions, and

afterward in fiscal year 1957 (25). A similar study was conducted by the Department into conditions in the frozen fruit and vegetable processing industry before and after the 1956 court decision declaring frozen fruit and vegetables to be exempt commodities (26).

The first study found that truck rates on fresh and frozen poultry appeared to have declined substantially after being put under exemption. Of the 210 rates from the principal States of origin to the 12 major markets considered, 82 percent were lower in 1956-57 than the 1952 regulated rates on fresh-processed poultry, and 85 percent of exempt rates were lower than the 1955 regulated rates on frozen poultry. During the same period, regulated truck rates and rail rates were rising.

The percentage reduction on fresh-processed poultry rates varied from 12 to 53 percent, and on frozen poultry, from 16 to 59 percent. For the 12 major markets combined, the average rate reduction on fresh poultry between 1952 and 1957 was 33 percent, and on frozen poultry between 1955 and 1957, 36 percent.

In addition to the freight rate, transport charges may include various charges for auxiliary services. The report shows that, before the exemption, stop-off charges ranged from \$5 to \$15 per stop and certain limitations were placed on the number of stops. After the exemption, many carriers reduced stop-off charges, and in some cases eliminated them entirely. Also, some carriers increased the number of stops allowed.

The second study compared rates on frozen fruit and vegetables in effect during 1955 and 1957 from the 166 principal points of origin to 12 major markets. About 88 percent of these rates, representing 94 percent of the total for-hire truck traffic in frozen fruit and vegetables, were lower in 1957 than in 1955. The weighted average decline in rates was 19 percent. During the same period, rail freight rates on frozen fruit and vegetables, from the same origins and to the same destinations, increased from 6 to 14 percent.

Again there were decreases in other charges. In 1955, motor carriers charged from \$8 to \$12 per stop, but in 1957 these charges were lower; in many instances, they

were approximately \$5 per stop. Prior to the exemption, only one stop was allowed at each of several markets, but in 1957 some carriers allowed 3 and 4 stops.

A followup study was made in 1960, following a 1958 amendment to the Interstate Commerce Act removing frozen fruit and vegetables from the exemption (32). The study found that, as a result of removal from exemption, many of the rates on frozen fruit and vegetables had increased. There were also increases in special charges.

In the earlier USDA studies cited above, shippers were asked to list various advantages and disadvantages of shipping by exempt and regulated carriers (table 1). As measured by the number of advantages and disadvantages mentioned, the price-product combination offered by the EMC was preferred to that of regulated carriers.⁶

To summarize, the available evidence seems to be consistent with the expectation of the Congress that free competition as a result of the agricultural exemption would provide higher quality services at lower rates to the shippers of agricultural commodities. It has been asserted, however, that incomes of farmers have not been improved because the

beneficiaries of the agricultural exemption are processors and dealers rather than farmers. The prices farmers receive for their commodities are alleged to be unaffected by transportation charges beyond the point of their delivery. This assertion was advanced to support the Interstate Commerce Commission's "farm to first market" proposal and since that time has been repeated on several occasions.⁷ Although the derivation of the necessary conditions under which this assertion might be shown to be untrue is beyond the scope of this report, there is some evidence that farmers or consumers have benefited from the lower transportation rates.

Recent changes in freight rates on feed grains shipped into the Southeast gave rise to a controversy over the extent to which the benefits from lower rail rates accrue to farmers and grain handlers. In a perfectly competitive market, the differences in prices between two areas equal transportation and handling costs. If savings in transportation costs due to lower freight rates are being passed on, a narrowing of the margin between prices in the two areas is observable. Eickhoff and Padgett compared the margins between corn prices in Midwestern and Georgia markets prior to and after rail rate reductions (6). These comparisons show that the reductions resulted in significant savings for corn consumers in Georgia. For example, the difference between corn prices in Georgia markets and those in St. Louis averaged from 5.89 to 8.06 cents per bushel lower during 1964, after the reductions, than during 1961-62. These savings varied from market to market and in general approximated the difference in transportation costs between shipments via barge-truck or barge-rail (the principal methods in 1961-62) and shipments via direct-rail at rates which were put into effect in 1963.

Furthermore, an analysis was made to determine whether margins between prices

Table 1.--Number of advantages and disadvantages listed by shippers of agricultural commodities, by commodity and type of carrier

Commodity and type of carrier	Advantages	Disadvantages	Total
Fresh and frozen poultry:			
Regulated.....	20	85	105
Exempt.....	82	33	115
Frozen fruit and vegetables:			
Regulated.....	58	70	128
Exempt.....	70	54	128

Sources: (25, pp. 47, 49, 51, 53; and 26, pp. 35, 37).

⁶ Examination of advantages and disadvantages cited by the shippers suggests that the assignment of equal weights to various advantages and disadvantages favors regulated carriers. It would be desirable to use actual distribution of shipments as weights for various advantages and disadvantages listed by shippers. However, such data were not available for analysis.

⁷ The "Doyle Report" contains the following observation: "There was no indication that consumer prices of frozen fruits and vegetables were reduced during the period from 1955 to 1959 when these commodities were on the exempt list" (30, p. 523; 22, p. 27; and 2, p. 23).

paid by handlers and f.o.b. market prices had changed since new rail rates were introduced. Increases in the margins would be an indication that handlers were retaining part of the reduction in rail rates. No change in margins would indicate that savings on transportation

costs were being passed back to sellers or on to grain buyers. The analysis showed that handlers' margins did not change after lower rail rates were initiated in 1963, indicating that grain handlers did not retain the savings in transportation costs.

PERFORMANCE OF THE EXEMPT SECTOR

It has been shown above that the EMC appear to provide a preferred price-product combination. This in itself may be an insufficient condition for concluding that EMC perform in an economically efficient manner. The performance of the exempt sector has to be measured against the criterion of economic efficiency. Optimum efficiency in resource allocation is achieved at the rate of output where the price equals the marginal cost of producing transport services.⁸

Decisionmaking in the Exempt Sector

Since a trucker in the exempt sector is not limited to serving specific points or maintaining specific schedules, before each trip he must decide whether to undertake it. Theoretically, he should undertake the trip if the round-trip revenue exceeds the direct costs of making the trip. But although the costs can be estimated and the revenue on the first leg of the trip is usually known (as in the case of an offer from the shipper), the return trip revenue is generally unknown at the start of the round trip. On the return trip, a trucker may earn various amounts (including zero), each amount being associated with some probability. The expected amount of the gross revenue on a return trip is the mean of this

probability function. The trucker should be willing to undertake the trip if total expected revenue (revenue on the trip to destination plus expected revenue on the return trip) exceeds the costs attributable to the round trip.

The decision process described above was inferred by the author from interviews with truckers in 1962. Although it is difficult to show empirically, their responses as well as actual decisions suggest that the truckers behaved as if they were basing their decisions on such calculations.

Several Texas drivers reported that during the peak shipping season for California's produce they were willing to take lower rates on commodities moving to the West Coast. One trucker, for example, said that he would haul grain during the peak shipping season at rates as low as 55 cents per 100 pounds if no other commodities were available, but by doing this he could barely break even. Another Texas driver stated that if he could find nothing better to transport to California than grain at 55 cents per 100 pounds, he would be indifferent about whether to go on the trip or not.

There are data for a hypothetical examination of the foregoing cases. The gross revenue on the return trip depends on the commodity transported. The subjective probability function of a trucker may be replaced by a more objective one by assuming that the probability of obtaining a return load of a specific commodity depends on the volume of that commodity being transported, e.g., the probability

⁸ For discussion of a qualification to the rule, see (23, pp. 344-347).

of 0.5 is assigned to a commodity which accounts for 0.5 of the total volume transported. The following probability function was esti-

Probability, f	(x)	.12	.33	.21	.19	.10	.06
Gross revenue,	(x)	559	600	608	616	632	702

The expected value of gross revenue on the return trip, denoted by $E(x)$, is given by

$$E(x) = \sum_{i=1}^N x_i f(x_i)$$

Following were the expected revenues and costs per round trip:

Expected revenues:

42,000 pounds of grain at 55 cents per 100 pounds	\$231.00
Expected gross revenue on the return trip	\$615.12
Total	\$846.12

Expected direct costs:

Variable costs - 3,200 miles at 24.7 cents per mile ¹⁰	\$790.40
Cargo insurance	\$ 8.92
Brokerage fee	\$ 49.21
Total	\$848.53

The results are consistent with the implied decisionmaking rule. Furthermore, the decisionmaking rule is consistent with the rule for the optimum use of resources since an additional round trip is provided only if the buyers of transport services are willing to pay the added costs.

⁹To calculate probabilities, carlot equivalents of major commodities transported during July 1962 were used (28, p. 4). During the peak shipping season for California's produce, the probability of not obtaining a backhaul is practically zero.

¹⁰ For method of estimating, see (20, p. 940).

mated for the main fruits and vegetables moving from California to Texas during a peak shipping month: ⁹

Rate-Cost Relationship

If competition in the exempt sector is reasonably effective, it should produce a rate structure patterned closely on the costs of providing services. There are some data to show gross and net revenues of exempt commodity traffic. Table 2 shows estimated gross and net revenue earned for transporting various agricultural commodities to or from California and from or to some out-of-State markets during 1963. Because of the joint products involved, revenue-cost comparisons are made for round trips only. The table, therefore, presents gross and net (shown in parentheses) revenues for various inbound/outbound commodity combinations as well as weighted average revenue for most of the important commodities. ¹¹

It is also likely that the net revenues earned exceed those shown. First, the estimated costs are based on California truckers' experience; carriers located in the Southern States are likely to have lower costs. For example, an average of 28.8 cents per mile was reported by 25 EMC operating in Delaware, Maryland, and Virginia, compared with the estimated 30.95 cents per vehicle-mile used in the California study (10, p. 15). Second, many fresh fruits and vegetables are shipped in mixed loads, and the revenue earned on mixed shipments is usually higher than on straight loads. For example, the revenue earned on a mixed shipment to Miami is \$1,300, compared with a weighted average of \$1,122 for straight loads; to New Orleans \$900, compared with a

¹¹ For estimating procedures and further discussion, see (19, pp. 940-944).

Table 2.--Estimated gross and net revenues per round trip on California inbound and outbound truck shipments for selected agricultural commodities, by market areas, 1963¹

Outbound	Carrots	Celery	Grapes	Lemons	Lettuce	Oranges	Potatoes	Tomatoes	Weighted average
Inbound									
Florida ³	-----Dollars ² -----								
Corn.....			1,950 (162)	1,750 (-38)	1,800 (12)			2,010 (222)	1,875 (87)
Grapefruit.....			2,050 (262)	1,850 (62)	1,900 (112)			2,110 (322)	1,972 (184)
Peppers.....			2,062 (274)	1,862 (74)	1,912 (124)			2,122 (334)	1,984 (196)
Tomatoes.....			2,180 (392)	1,980 (192)	2,030 (242)			2,240 (452)	2,102 (314)
Weighted average.....									1,956 (168)
Illinois ⁴									
Meat.....	1,855 (475)	1,840 (460)	2,035 (655)		1,785 (405)	1,815 (435)		2,030 (650)	1,887 (507)
Louisiana ⁵									
Poultry.....			1,500 (214)	1,350 (64)	1,370 (84)	1,350 (64)		1,510 (224)	1,415 (129)
Texas ⁶									
Onions.....		1,258 (164)	1,236 (142)	1,116 (22)	1,216 (122)		1,096 (-2)	1,286 (192)	1,210 (116)
Watermelons.....		1,242 (148)	1,220 (126)	1,100 (6)	1,300 (206)		1,080 (14)	1,270 (176)	1,194 (100)
Poultry.....		1,192 (98)	1,170 (76)	1,050 (44)	1,150 (56)		1,030 (-64)	1,220 (126)	1,140 (46)
Grain.....		1,043 (-51)	1,021 (-73)	901 (-193)	1,001 (-93)		881 (-213)	1,071 (-23)	995 (-99)
Washington ⁷									
Apples.....			1,011 (435)		980 (404)			1,047 (471)	1,002 (426)
Potatoes.....			976 (400)		945 (369)			1,012 (436)	967 (391)
Onions.....			934 (358)		903 (327)			970 (394)	925 (349)
Grain.....			1,029 (205)		998 (174)			1,065 (241)	1,020 (196)

¹ Revenue estimates based on an average of rates quoted by trucking firms and truck brokers located in California. Where rates were quoted per container rather than per load, modal number of containers per load was estimated from California border station inspection records. Weighted average revenue calculated by using the number of carlot equivalents of specified commodities shipped to or received from selected States in 1963. Shipments reported in California Truck Passings Summary, Fresh Fruits and Vegetables, 1963 (Sacramento: Federal-State Market News Service, 1964), pp. 5-7 and 57-58. Cost estimates based on mileage from Fresno, Calif., and an average cost of 30.95 cents per mile.

² Net revenue indicated in parentheses.

³ Based on rate to Miami, Fla. Round trip 5,778 miles.

⁴ Based on rates to Chicago, Ill. Rate on meat from Chicago to west coast destinations \$2.67 per 100 pounds, 38,000 min. Round trip 4,460 miles.

⁵ Based on rates to New Orleans, La. Round trip 4,156 miles.

⁶ Based on rates to Houston, Texas. Round trip 3,536 miles. Poultry rates obtained from receivers in Los Angeles area.

⁷ Based on rates to Seattle, Wash. Round trip 1,862 miles. If a carrier obtains a load of potatoes or onions in Oregon rather than in Washington, the gross revenue on the return haul on potatoes is \$315 and on onions \$336 compared with \$420 and \$378 from Washington origins. Grain on return loads usually originates in Idaho or Montana adding approximately 800 miles to the trip.

Source: (20, p. 942).

weighted average of \$815; and to Houston \$700-\$750, compared with \$694.

An examination of estimated net revenue indicates that the rates earn a freight revenue at least equal to the average direct cost of the round trip. The only exception is where the inbound commodity from Texas is grain. In that case, although the round trip makes some contribution to fixed costs, the revenue is not sufficient to cover average costs.

The general pattern that emerges from cost-revenue comparisons seems to be as follows: Where the inbound/outbound traffic of exempt commodities was balanced, as in the case of the three southern States, the total freight revenue earned was approximately equal to the average total cost of the round trip. Where backhauls were not always so likely to be available, as in the State of Washington, the greater probability of an empty return appears to be reflected in a level of rates which would yield loaded round-trip revenue above round-trip costs. Freight revenue is also higher than average round-trip cost when the commodity hauled on one leg of the trip is regulated. The case of meat from Illinois to California indicates a backhaul competitive advantage of a carrier holding an operating authority, provided the carrier's operating costs are similar to those of EMC.

Of course, it is not the ability of a carrier to cover costs on a single round trip but its ability to cover the total costs in the long run which is crucial. Farmer (7, pp. 402-403) compared operating data for regulated and exempt carriers and found that the EMC revenues were substantially below those of the regulated common and contract carriers. The EMC earned \$0.0344 per intercity ton-mile, compared with \$0.08126 for common carriers of general freight and \$0.0942 for contract carriers. However, the operating costs of EMC were much lower than those of regulated carriers (\$0.0324 for exempt, compared with \$0.08094 for common and \$0.1018 for contract), so that the largest profit (net revenue per ton-mile) was made by the EMC.

His findings were consistent with estimates based on the 1963 Census of Transportation. The EMC in the census sample had an operating ratio of 91, compared with the

operating ratio of 94 for Class III regulated motor carriers. Both EMC and regulated carriers, however, earned the same profit, 3 cents per mile (21, pp. 19-21). These data suggest that the EMC are able to cover total costs, on the average.

Indirect evidence also is consistent with the above findings. The EMC rely exclusively on transportation of exempt commodities for their revenues. A decline in the supply of EMC should be observed if they were not covering their total costs. Although no data are available, it is generally assumed that the EMC instead of contracting are contributing to the absolute and relative growth of the nonregulated sector.¹²

Rate-Distance Relationship

Rate-distance relationships provide data for some evaluation of the hypothesis that exempt rates are closely related to costs. An analysis of exempt rates on California grapes, lettuce, and tomatoes to selected out-of-State destinations shows a high correlation between truck freight rates and distance of haul. In fact, distance explains more than 90 percent of the rate variation in the sample for all three commodities (table 3).

There also are data to show what happened to the rate-distance relationship when a commodity was declared exempt. Before fresh and frozen poultry were exempted, distance explained only 56 percent of the variation in regulated truck rates from the main out-of-State origins to San Francisco. After the exemption and subsequent rate changes, distance explained 81 percent of the variation in exempt rates. Of course, other conditions may have changed in this interval.

Since variable costs are the predominant costs in the exempt motor carrier operation, distance is the main variable affecting the costs. Thus, a close relationship between exempt freight rates and distance suggests that the costs of supplying specific transport services are reflected in the specific rates charged.

¹² For example, see various annual reports of the Interstate Commerce Commission.

Table 3.--Relationship between truck freight rates on selected agricultural commodities and distance

Commodity	Number of rates	Regression equation	r ²
<i>Dollars/cwt.</i>			
Fresh fruits and vegetables (1963) ¹			
Grapes.....	21	$Y = 0.2564 + 0.0012X$ (0.00007)	.94
Lettuce (Northern destinations).....	23	$Y = 0.2649 + 0.0009X$ (0.00005)	.94
(Southern destinations).....	11	$Y = 0.1440 + 0.0010X$ (0.00009)	.92
Tomatoes.....	19	$Y = 0.7679 + 0.0018X$ (0.00009)	.96
Poultry ²			
Fresh poultry (1952).....	14	$Y = 1.0090 + 0.0021X$ (0.0005)	.56
Frozen poultry (1955).....	15	$Y = 0.6937 + 0.0025X$ (0.0006)	.56
Fresh and frozen poultry (1956-57).....	15	$Y = 0.2307 + 0.0010X$ (0.00014)	.81

¹ Highway mileage from Fresno, Calif.

² Calculated from rates shown in 25, table 49, p. 78. Mileages from approximate geographic center of each State of origin to San Francisco.

Source: (20, p. 945).

"Excessive Competition"

It is maintained by some that in the absence of public regulation the motor carrier industry has a tendency toward excess capacity which would lead to "excessive" (destructive or cut-throat) competition and a continuous pricing of services below costs. Yet, in spite of losses, the excess capacity would neither be withdrawn by disinvestment nor would it discourage a constant inflow of new resources which would tend to offset whatever disinvestment may have occurred. Hence, the industry would be plagued with a chronic redundancy of capacity, and would never reach a stable equilibrium (31, p. 389 and 15, pp. 645-646 and 661).

The "excessive competition" hypothesis suffers from two weaknesses: (1) It has no satisfactory theoretical explanation;¹³ (2) the available evidence is not consistent with the hypothesis.

¹³ The "excessive competition" argument may have some meaning in an oligopoly market, where fixed costs account for a large share of total costs for each firm, resources are highly specialized, and interdependence among the firms is not recognized. This is clearly not applicable to the motor carrier industry. For further discussion of theoretical issues, see (20, pp. 936-939).

The evidence discussed in the previous section indicates that the exempt rates, although lower than regulated rates, are sufficient to cover the total costs of EMC in the long run. This is inconsistent with the "excessive competition" hypothesis. Further evidence to test the hypothesis is provided by a survey of truckers at California border inspection stations.¹⁴

It is sometimes maintained that, due to "excessive competition," profits in the exempt sector are not high enough to attract new resources. Thus, the vehicles operated by the exempt carriers are inferior to those operated by regulated carriers. Since one type of inferiority is indicated by the age of equipment, if the above assertion is correct one should observe a larger percentage of new trucks operated by regulated than by exempt carriers.

The data on age of truck-tractors operated by three types of carriers in a sample are summarized in table 4. The chi-square test was used to test the relationship between the age of truck-tractors operated and the type of carrier. The computed value of X^2 was 0.18,

¹⁴ The findings of the survey as well as the nature of the data are summarized in (17).

Table 4.--Distribution of a sample of truck-tractors by age and type of carrier, California, 1965¹

Type of carrier	Age of truck-tractors (years)			Total
	1	2 or 3	4 or more	
Exempt.....	43	30	36	109
Private.....	24	17	20	61
Regulated.....	15	10	11	36

¹ Sampled from trucks passing California border inspection stations.

Source: (17, p. 227).

Table 5.--Distribution of truck-tractors by year model and type of carrier, United States, 1963

Year model	Type of carrier	
	Exempt	Regulated
	-----Percent-----	
1963.....	9.3	7.7
1962.....	11.1	13.2
1961.....	7.5	10.0
1960.....	15.4	13.3
1959.....	10.5	14.0
1955-58.....	32.3	28.2
1950-54.....	12.2	10.7
1949 and older.....	1.7	1.7
Total	100.0	100.1

Source: (18, p. 9).

indicating no significant difference between age of truck-tractors and type of carriers.¹⁵

This finding for trucks passing California border inspection stations was substantiated by the 1963 Census of Transportation. No significant differences in age were found for truck-tractors operated by EMC and those operated by regulated carriers (table 5). The conclusion of no significant differences was verified by applying the chi-square test to the data. The calculated value of X^2 was 3.88, well below the 14.07 value needed at the 5 percent significance level to accept the hypothesis of significant differences in age of truck-tractors operated by the two groups of carriers.

These findings are also consistent with Hunter's conclusion, based on interviews with

¹⁵With two degrees of freedom, we would accept a significant relationship if X^2 exceeded 5.99. The results were consistent with findings of Oi and Hurter that there was no significant difference between percentages of new vehicles operated by private and common carrier (23, p. 75).

truck brokers, that there has been ample investment in the exempt sector not only to provide for growing capacity but also for larger, more efficient equipment as a means of offsetting rising labor and other costs (9, p. 23). Buyers of transportation services in California stated that in recent years there has been a significant improvement in the supply and type of equipment available for transportation of fresh fruit and vegetables.

It may be argued, however, that the resources are maintained in the industry and also attracted into the industry only through a very rapid turnover of carrier firms. It is alleged that such a large-scale instability plagues the exempt sector at present.¹⁶

Such alleged instability during the depression of the 1930's was attributed partly to owner-driver firms (16, p. 216). Predominance of the owner-driver firms in the exempt sector today could be a potential source of instability. However, only 17 trucks or 15.2 percent of vehicles sampled were driven by owners themselves.

A large-scale instability also may result in drastic changes over time in the distribution of firms by size. The comparison of data, however, did not indicate any significant changes in the distribution of truck-tractor fleets after 1960 (table 6). The size of most firms, as measured by the truck-tractor fleet, remained relatively small. The median size of the truck-tractor fleet increased from four truck-tractors in 1960 to five in 1965.

Data on distribution of exempt carrier firms by years in business in 1960 and 1965 allow a more definite test of the alleged instability of exempt trucking. If one takes the 1960 distribution and assumes that none of these firms left the industry, the firms in each class would have moved into the next class by 1965. Since the 1965 data show that approximately 10 percent of the firms entered the business during 1960-65 it was assumed that an additional 10 percent of the firms in business in 1960 entered the industry. This gave an estimated distribution of carrier firms by

¹⁶For example, W. M. McCurdy, president of Perishable Commodity Carrier Association, stated in 1961 that about one-third of the small competitive truckers in his area go out of business each year (29, p. 1005 and 15, pp. 645-646).

Table 6.--Distribution of vehicles by size of truck-tractor fleet, exempt motor carriers, United States, 1960¹ and 1963,² and California, 1965³

Size of truck-tractor fleet	1960		1963		1965	
	Truck-tractors	Distribution	Truck-tractors	Distribution	Truck-tractors	Distribution
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
1.....	504	15.0	4,128	22.1	24	21.6
2 or 3.....	826	24.6	3,817	20.5	21	18.9
4 or 5.....	483	14.4	2,509	13.5	14	12.6
6 to 9.....	507	15.1	2,896	15.5	18	16.2
10 or more.....	1,039	30.9	5,293	28.4	34	30.6
Total.....	3,359	100.0	18,643	100.0	111	99.9

¹ Based on a survey by U.S. Dept. Agr.

² Based on the Census of Transportation.

³ Based on a sample of trucks passing California border inspection stations.

Source: (18, p. 9).

Table 7.--Distribution of carrier firms by years in business, exempt motor carriers, United States, 1960¹, and California, 1965²

Years in business	Carriers, 1960		Carriers, 1965		
			Actual		Estimated ³
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>
1 to 4.....	223	16.1	9	9.8	10.0
5 to 9.....	261	18.9	11	12.0	14.6
10 to 14.....	298	21.6	17	18.5	17.0
15 to 19.....	189	13.7	19	20.6	19.4
20 to 24.....	161	11.7	12	13.0	12.3
25 to 29.....	135	9.8	9	9.8	10.5
30 or more.....	114	8.2	15	16.3	16.2
Total.....	1,381	100.0	92	100.0	100.0

¹ Based on a survey by U. S. Dept. Agr.

² Based on a sample of trucks passing California border inspection stations.

³ Estimate is based on the assumption that none of the firms left the industry after 1960 and new entries accounted for 10 percent of all firms during 1961-65.

Source: (17, p. 227).

years in business in 1965 based on the assumption that no firms left the industry during the previous 5 years. A comparison of the estimated distribution with the actually observed distribution in 1965 shows a very close agreement (table 7).

The estimates also may be considered as theoretical frequencies and compared with frequencies actually observed in 1965. The chi-square test was used to test the differences between theoretical and observed frequencies. The computed X^2 was equal to 0.676, indicating that, with 6 degrees of freedom, there is less than one chance in a hundred that the two frequency distributions are significantly different.

The hypothesis of "excessive competition" is also inconsistent with the conclusions of

two studies in the economics of transportation, that in the absence of regulation, workable competition could be achieved in highway transportation (16, pp. 238-241, and 23, p. 355).

Further evidence is available in two recent studies dealing with other modes of transportation, which in many respects resemble those of motor carriers. In both studies, the authors stated that there appears to be no valid basis for concluding that adequate competition would not exist in either of the transportation modes (8 and 4, pp. 382-387).

The recent Australian experience with nonregulated trucking also yields some evidence on stability of the motor carrier industry in the absence of regulation. In 1954 all forms of interstate transport in Australia were freed from economic regulation.

Although rate wars followed deregulation, by late 1957 an equilibrium had been attained and rate stability has prevailed since 1958, despite the Australian trade recession of 1960-61. Thus, the predicted competition at

prices below short-run direct costs, regarded by some economists as an inevitable outcome of deregulation, has not occurred. The industry now seems to be stable and efficient (13, pp. 275-285).

EFFECTS OF AGRICULTURAL EXEMPTION ON RAILROADS, PRIVATE AND REGULATED MOTOR CARRIERS

The agricultural exemption may have had some undesirable effects on other modes of transportation or on other sectors of the motor carrier industry. Some go so far as to state that the agricultural exemption "... has made a major contribution to the comparative economic stagnation of our whole common carrier system" (2, p. 23). This section presents some evidence relevant to an evaluation of the question as to whether the exemption has adversely affected the efficiency of the transport system.

Since the lumping of railroads and other regulated common carriers into a single "common carrier system" may lead to erroneous or misleading conclusions, the effects on railroads, on private motor carriers, and on regulated motor carriers are investigated separately.¹⁷

Railroads

A priori it was expected that the main effect of the agricultural exemption on railroads was a possible diversion of exempt commodity traffic from rail to trucks. The relative share of railroads in the total traffic of the Nation has been decreasing for the last two decades, while the actual volume of rail traffic remained about the same from 1955 to about 1964. Thus, the railroads not only failed to participate in the growth of total traffic, but for many commodities the absolute volume

hailed has declined. It is much more difficult, however, to estimate how much, if any, of this decline can be attributed to the agricultural exemption.

The effect of agricultural exemption could be shown by comparing the traffic trend of the agricultural commodities to that of non-agricultural commodities. If agricultural exemption caused a significant diversion of traffic from rail to trucks, the evidence should show a faster decline in the absolute and/or relative tonnage of agricultural traffic, compared with the traffic of other than agricultural commodities. The evidence, however, is inconsistent with this expectation (fig. 1). In both absolute and relative terms, the diversion of traffic from rail to other modes of transportation was more rapid for nonagricultural commodities.

Obviously, the measurement is inexact. Factors other than agricultural exemption affected shifts among the modes of transportation. To isolate the effects of agricultural exemption, traffic patterns of the following four major groups of agricultural commodities were examined: Livestock, fruit and vegetables, wheat, and meat.

Motor carriers operating under the agricultural exemption provided an alternative to rail transportation for shipping exempt commodities. Since the truck rates on exempt commodities are established in an unregulated market, it is not likely that the exempt rates would adjust in response to changes in rail rates to reestablish the differential. An increase in rail freight rates, therefore, should have resulted in diversion of traffic from railroads. Further, since meat is a nonexempt commodity, this alternative was not available to shippers of meat. The meat tonnage trend, therefore, should show a slower decline than that of the three commodities which are exempt,

¹⁷ The most notable example of a misleading conclusion due to combining transport modes is the alleged decline in the common carrier freight traffic, which has been shown to be attributable instead to a shifting composition of intercity freight traffic among the modes. More specifically, rail transportation, which is virtually all common carrier traffic, now accounts for a smaller fraction of intercity ton-miles. Within each mode, common carriers have retained approximately the same share of freight traffic (23, pp. 11-12).

RAIL FREIGHT TRAFFIC, FARM OUTPUT, AND INDUSTRIAL PRODUCTION INDEXES

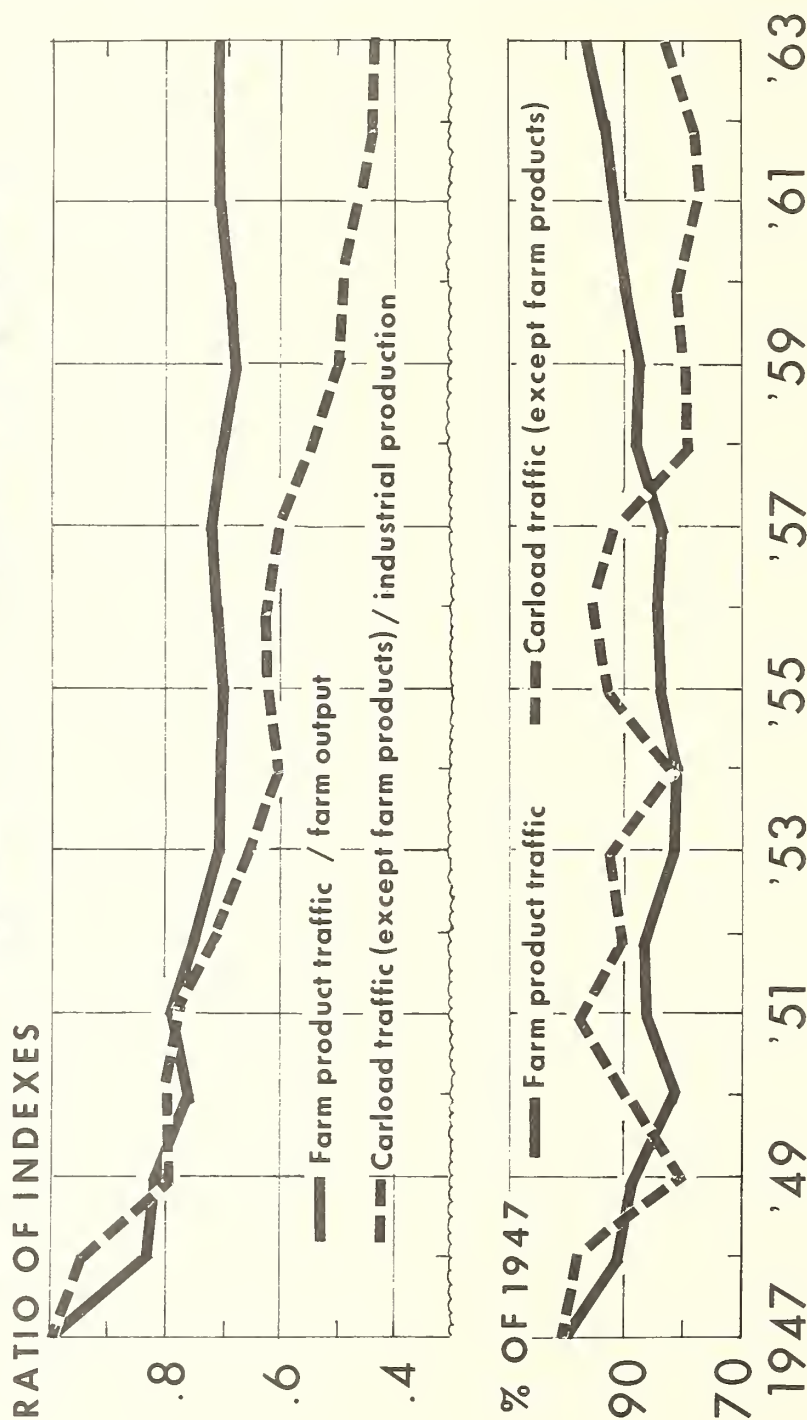


Figure 1

if the exemption is a principal factor in traffic diversion away from railroads.

Rail freight rates on all agricultural commodities were rising from 1947 to 1957 (fig. 2). During that period, rail freight rates on meat and livestock rose to the same relative extent each year, but the decrease in traffic was much more rapid for livestock than for meat (fig. 3). Furthermore, the decrease in tonnage of meat and meat products was smaller than that of fruits and vegetables despite larger increases in rail rates on meat and meat products relative to those on fresh fruits and vegetables.

The wheat traffic trend and trends since 1957 of all commodities shown seem to be unrelated to the agricultural exemption. In fact, the greatest relative decrease in freight rates occurred on meat--a nonexempt commodity. The close relationship between meat and livestock rates between 1947 and 1957 is inconsistent with the expected downward pressure on rail freight rates of exempt commodities.

So far, the difference in quality of services provided by rail and trucks has been ignored. Undoubtedly, some of the diversion from rail to trucks occurred because of the service factor, which was not affected by the agricultural exemption. Abdou, for example, concluded that "...the service factors have been the most important and the strongest appealing reasons for diversion of livestock from rail to trucks" (1, p. 962). For certain types of produce traffic, truck services are clearly preferred. This is indicated by the high percentage of mixed loads in the truck shipments of produce from California, as well as by the numerous multiple pickups and split deliveries (19, pp. 7-11).

In summary, the effects of the agricultural exemption on railroads proved to be rather difficult to isolate. Although the shift from rail for some traffic between 1947 and 1957 might be attributable to the agricultural exemption, it might also be explained by the service advantages of trucks. The traffic trends since 1957 seem to have been unaffected by the agricultural exemption. Thus, although no quantitative estimate can be made, it appears that major or substantial ills of the railroads cannot be laid to the agricultural exemption.

A priori it may be expected that the agricultural exemption encouraged the growth of private carriage by providing backhauls of agricultural commodities to private carriers. There is some evidence to substantiate such an expectation.

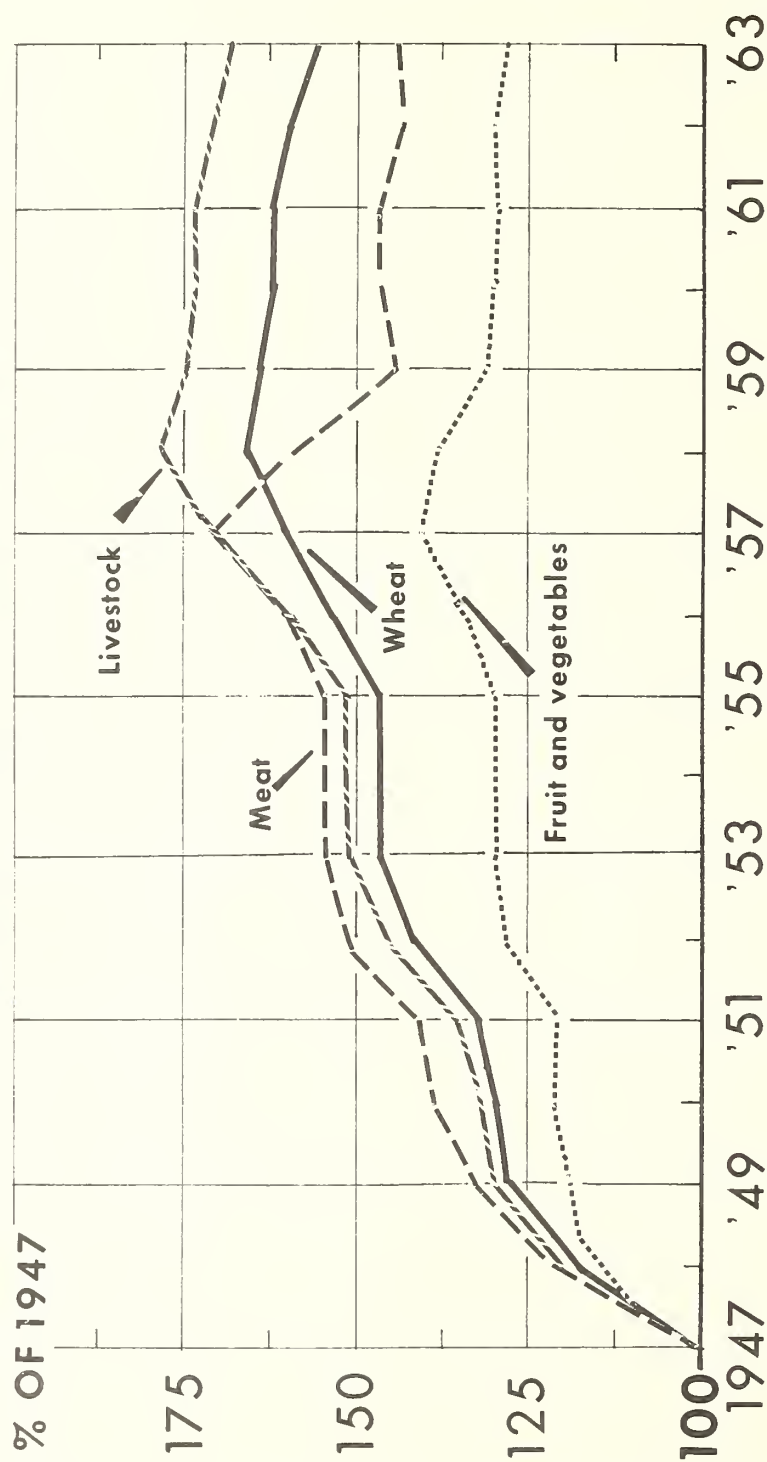
In 1961, an estimated 29,000 private carriers were operating in the United States.¹⁸ Seven thousand of these (24 percent) were engaged in some transportation of exempt commodities. The exempt commodity traffic of private carriers that year totaled 114 million tons and accounted for 52 percent of their total mileage. However, only 38 percent of the miles traveled with the exempt commodities were in interstate trips. Assuming the division of tonnage between interstate and intrastate traffic to be proportional to the mileage driven, the estimated tonnage affected by agricultural exemption totaled about 42 million tons.

Not all of this tonnage can be attributed to the agricultural exemption, since the firm's primary activity (other than trucking) may involve an exempt commodity and its transportation would not in any case be affected by the agricultural exemption. Furthermore, some of the private carriage would be profitable even without a backhaul of exempt commodities. However, 78 percent of the tonnage of exempt commodities hauled by private carriers was on inbound trips and only 22 percent on the outbound leg of the trip. Thus, although the aggregate effect of the agricultural exemption cannot be quantified, the data substantiate the a priori expectation that the agricultural exemption did provide backhauls and so may have encouraged private carriage.

A contrary tendency also should be noted. The EMC, because of their cost-based rates, can substitute for private carriage by exempt commodity shippers, and thus discourage the growth of private carriage. Evidence of such

¹⁸ Excludes petroleum and soft-drink firms. The number of private carriers was estimated by adjusting the Interstate Commerce Commission list for errors. Adjustments were made on the basis of responses to the random sample used in (11). All other estimates in this section were also based on the ICC list and (11).

RAIL FREIGHT RATE INDEXES OF SELECTED AGRICULTURAL COMMODITIES

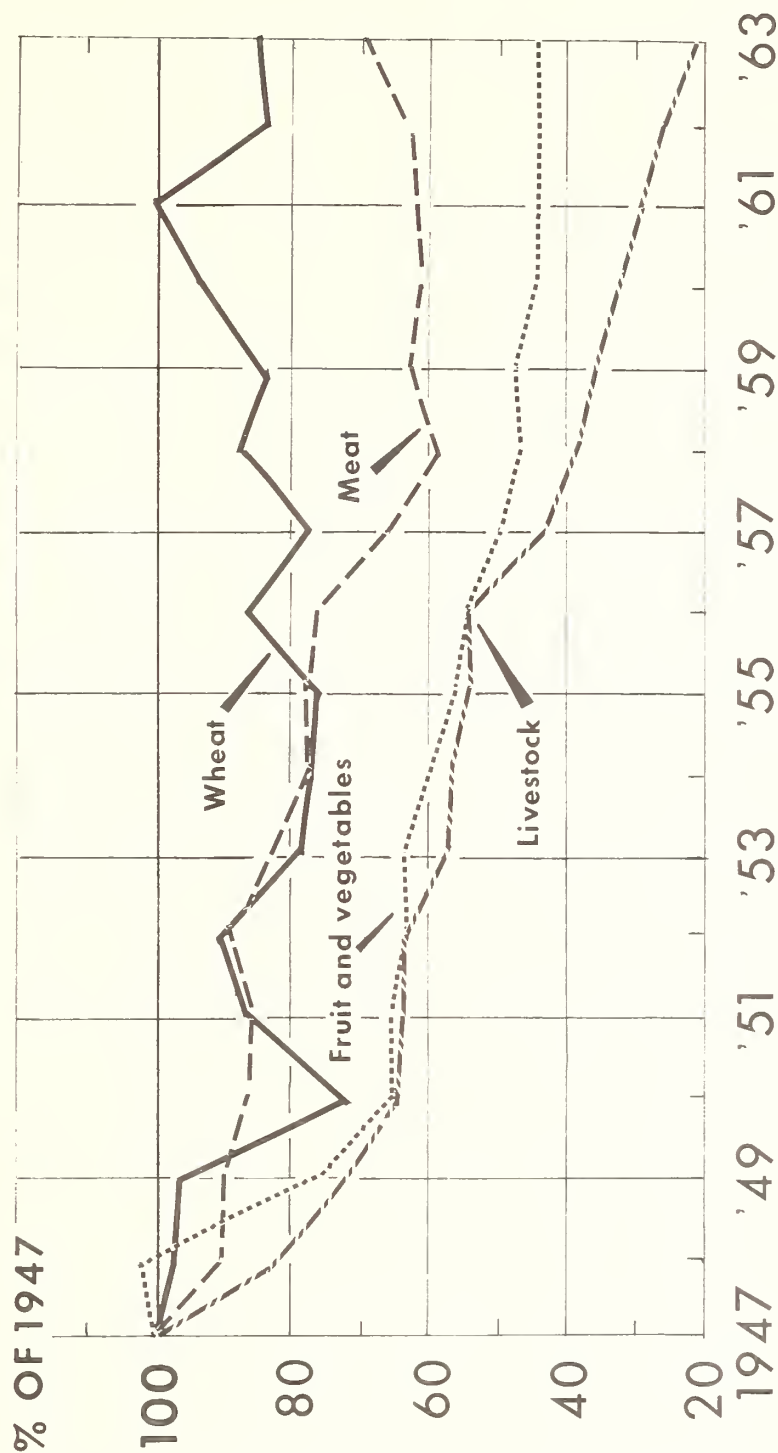


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Figure 2

INDEXES OF RAIL FREIGHT TONNAGE OF SELECTED FARM COMMODITIES



SOURCE: FREIGHT COMMODITY STATISTICS, INTERSTATE COMMERCE COMMISSION.

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Figure 3

a tendency comes from two U.S. Department of Agriculture studies (25 and 26). Prior to the court cases in 1955 exempting frozen fruit and vegetables from regulation, private trucks (processor and buyer owned) accounted for 35 percent of total shipments by truck, and regulated for-hire carriers accounted for the remaining 65 percent. After the exemption in 1957, not only did the share of private trucks decrease to 29 percent, but their absolute tonnage decreased about 6 percent, while that of for-hire carriers increased by 26 percent. During the same period, the commercial production of fruits and vegetables increased by 13 percent.

Similar results are shown in the poultry study. Before the court cases in 1952 declaring fresh poultry an exempt commodity, private carriers accounted for 62 percent of truck shipments and for-hire carriers for 38 percent. After fresh poultry was declared exempt, the relative share of private carriers decreased to 48 percent in 1956-57, and that of for-hire carriers increased to 52 percent. The absolute tonnage of private carriers increased by 56 percent, while that of for-hire carriers increased by 182 percent. Similarly, the relative share of private trucks decreased from 34 percent of total truck shipments of frozen poultry in 1955 (before exemption) to 26 percent after frozen poultry was exempted in 1956-57. On the other hand, the percentage of for-hire trucks increased from 66 to 74. The absolute tonnage of private trucks increased by only 3 percent, while that of for-hire trucks increased 48 percent. The exempting of commodities clearly resulted in a shift of traffic to for-hire and away from private carriage in both relative and absolute terms.

Because of the two opposing tendencies, the net effect of agricultural exemption on the growth of private trucking is not certain.

Regulated Motor Carriers

There is evidence that the agricultural exemption caused diversion of exempt commodity traffic from regulated to exempt motor carriers. The two studies cited above show that after fresh-processed poultry was declared exempt, the percentage of total for-

hire traffic hauled by regulated motor carriers decreased from 100 to 18 percent, while that hauled by EMC increased to 82 percent. Similarly, in the case of frozen poultry, the relative share hauled by regulated carriers decreased from 100 to 30 percent. After frozen fruits and vegetables were declared exempt, the diversion of traffic was smaller. The share hauled by regulated motor carriers dropped only to about 71 percent and the exempt carriers' share rose to 29 percent (25, pp. 13 and 21, and 26, p. 16.).

Further evidence shows that the importance of exempt commodity traffic to the regulated motor carriers has been negligible. In 1961, Class I common and contract motor carriers (i.e., carriers with annual gross operating revenues of \$1,000,000 or more each) hauled approximately 5 million tons of exempt commodities, which accounts for only 3 percent of all regulated truckload traffic and for 3.7 percent of revenue.¹⁹ Since Class I motor carriers accounted for more than 60 percent of the total operating revenue of all motor carriers, assuming that revenue earned is an index of tonnage, all regulated motor carriers hauled an estimated total of 8.3 million tons of exempt commodities (24, p. 24). Thus, even large errors in data would not change the conclusions that, relative to exempt and private carriers, the regulated motor carriers are not important in truck transportation of exempt agricultural products.

What is the explanation for the meager participation of regulated motor carriers in the exempt commodity traffic? A motor vehicle is exempt from economic regulation by the Interstate Commerce Commission so long as nonexempt commodities are not moved along with exempt ones in the same truck at the same time. That is, it is not the regulated status of the carrier but the commodity transported that determines the exempt status of the vehicle. Thus, regulated motor carriers have the same opportunity as exempt and private carriers to compete for the exempt commodity traffic. In fact, the regulated carriers should have a competitive advantage over the

¹⁹Products of agriculture and fish and oil. The estimates include frozen fruit and vegetables, which are not exempt, and exclude animals, which are exempt (24, p. 23).

exempt carriers in the case of backhaul of exempt commodities, since on one leg of the trip they may earn higher revenue because of higher regulated rates.

A possible explanation can be offered by cost considerations. Assuming that a regulated carrier is a profit-maximizing entity, it should undertake to produce transport services as long as it can recover the cost of supplying them (including a normal profit). The failure of regulated motor carriers to compete effectively for the exempt commodity traffic suggests cost differences between exempt and regulated carriers. Evidence presented in an earlier section has shown that regulated motor carriers have higher operating costs than exempt carriers.

One explanation attributes higher operating costs of regulated motor carriers directly to regulation. It is possible that the route, gateway, and commodity restrictions in the operating authorities of regulated carriers make it difficult to integrate trips with exempt commodities into the total company operation (2, pp. 26-27). One obvious example is where these restrictions would result in an empty backhaul because the firm could not legally carry an available nonexempt commodity or serve a particular market.

A second possible explanation attributes higher operating costs to significant differences in input prices--primarily labor. The actual differences in labor costs between exempt and regulated carriers are difficult to determine. Wage rates vary among areas. The remuneration of exempt carrier drivers is usually a percentage of gross revenue. The imputation of wage to owner-drivers presents several complications. It is conceivable, however, that an exempt carrier firm, either having a driver-owner or employing nonunion drivers, can have lower costs for several reasons. First, because regulated firms tend to be larger and more subject to unionization, wage scales there may be higher than wages paid for drivers by smaller firms operating under the exemption. Second, a driver-owner who prefers to be in business for himself may accept a lower imputed wage rate than he could get working for others. Third, wages of local drivers in most cities have been significantly lower than wages of long-haul drivers.

Thus, if the next best opportunity of an exempt carrier driver is employment as a local driver, he may accept a lower wage than the applicable union rate and still be better off.

The costs of regulated motor carriers, however, may only appear to be higher due to some arbitrary allocation of certain costs. For example, higher costs of regulated motor carriers are sometimes attributed to a high percentage of less-than-truckload (LTL) traffic which requires costly terminal handling and, therefore, results in higher aggregate costs. The cost of handling LTL shipments, however, is irrelevant for exempt commodity traffic, since this traffic is in truckload quantities.²⁰ The ability of regulated motor carriers to compete for exempt traffic would be adversely affected if truckload shipments of exempt commodities were expected to subsidize unprofitable (or less profitable) LTL traffic. Thus, if some portion of terminal operating costs is mistakenly assessed by regulated carriers against truckload traffic of exempt agricultural commodities, the costs of regulated motor carriers may appear to make them noncompetitive.

The higher costs of regulated motor carriers have also been attributed to the common carrier obligation to supply transport services at published rates to all who seek such services. Faced with an uncertain demand, a carrier that holds itself open to take any good in any quantity must at times maintain excess capacity. Exempt carriers avoid some of the costs of maintaining this excess capacity by their ability to shift among markets.

The regulated motor carriers, however, do not have a common carrier obligation to provide truck transportation of exempt commodities. The regulated motor carriers may (and sometimes do) refuse to transport exempt commodities offered. Since the exempt commodity traffic does not benefit from the common carrier obligation, no portion of public service costs should be assessed on this traffic. If, however, regulated motor carriers mistakenly assess such costs against exempt

²⁰ Any consolidation of less-than-truckload traffic in truck transportation of exempt commodities is usually done by shippers or receivers, and pickups are made from shippers' platforms directly into vehicles used for long-distance hauls.

traffic, the costs of the regulated motor carrier may then seem to be higher than those of the exempt carrier.

In this and previous cases, however, the cost differences have been assumed to result from arbitrary allocation of certain costs and the necessity for internal subsidy to offset losses on some unprofitable traffic common carriers are obligated to handle.²¹ Such an artificial distribution of costs is not likely to influence regulated carrier management in deciding whether to carry exempt commodities. The meager participation, therefore, is probably due to differences in real costs between exempt and regulated motor carriers, rather than to faulty allocations of costs for rate-making purposes.

Overall, then, the impact of the agricultural exemption has been to reduce the growth of the regulated sector of the motor carrier industry. This is not necessarily an undesirable effect from the point of view of economic efficiency. First, as was pointed out above, it is likely that the exempt carriers have lower costs for equivalent services than the regulated motor carriers. If this is true, the exempt

carriers are more efficient. Their continued existence in the face of competition from railroads and private and regulated carriers demonstrates their relative efficiency. Second, there is no single size of the common carrier system which is "needed."²² The size of the common carrier system depends on the willingness of shippers to pay for it. The size of the system, therefore, like the quantity of any other commodity, depends on price. If shippers are not willing to pay for an increased capacity of common motor carriers, the capacity should not be expanded.

Thus, the major impact of the agricultural exemption has probably been on regulated motor carriers. The effects on railroads are probably marginal, compared with other effects, and the net effects on growth of private carriage are uncertain.

A more definite conclusion regarding the impact of agricultural exemption on transport efficiency must await empirical verification of the real cost differences between regulated and exempt carriers, but the evidence now available suggests that the exemption is not inconsistent with national transportation policy.²³

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²¹It may be argued that the common carrier obligation is necessary only because of discrimination (rates based on value of service) and internal subsidy. If all rates were based on costs, no common carrier obligation would be needed, since all shipments would be equally profitable. The common carrier obligation, however, may be justified if shippers benefit from knowledge that the capacity is available for use by them, even though they do not plan to use it. For further discussion, see (8, pp. 337-338).

²²Although economic theory does not admit the concept of "need," it is frequently mentioned in transportation economics literature. In a strict sense, "need" implies a vertical demand curve, not a negatively sloping demand curve. The concept of "need," therefore, must have noneconomic meaning.

²³This paper considers economic efficiency in resource use. Other factors could be considered more important in policy decisions. At present, however, economic efficiency seems to be a major goal of public policy in transportation (5, pp. 124-128).

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